



PUMP FOR DISPENSING FLUID PRODUCTS

The present invention relates to a pump for dispensing fluid products, and a device for dispensing fluid products comprising such a pump.

Pumps for dispensing fluid products are well known
5 in the prior art, and are used to dispense fluid
products, particularly in the areas of perfumery,
cosmetics or pharmacy. These pumps generally comprise a
pump body and a pump chamber in which at least one
10 piston slides in order to dispense a dose of product
each time it is actuated. The pump chamber generally
comprises an inlet valve and an outlet valve. A
dispensing head incorporating the dispensing orifice is
generally assembled on the pump, said head comprising
15 an expulsion channel connecting said pump to said
dispensing orifice. In particular when the fluid
product is a pharmaceutical product, it may be
necessary to avoid any contamination of this product,
in which case a shutter or obturator can be provided in
the dispensing orifice. This shutter is generally
20 driven to its closed position by an elastic element,
and is opened at the time of expulsion in order to

allow the product to come out. When the device is a spray device, an insert may additionally be provided placed in the expulsion channel to reduce the ullage or dead volume thereof and to promote the spraying of the product. Since the pump is part of a device for dispensing fluid product, a retaining or fixing ring is generally provided to anchor or fix this pump to a tank containing the fluid product. A plunger or dip tube may also be combined with the pump in order to extend to the bottom of the tank and allow the totality of the product contained therein to be dispensed. This type of pump, which is well-known, comprises a relatively high number of constituent parts, which makes its manufacture and assembly relatively complicated and expensive. Another problem which may arise, particularly when the fluid product is a pharmaceutical product, is that the product is generally in contact with the pump springs, these generally being made of metal. Depending on the pharmaceutical product under consideration, this type of contact with a metal product may be damaging and cause the product to be corrupted.

The purpose of the present invention is to provide a pump for dispensing fluid product which does not reproduce the above-mentioned drawbacks.

More particularly, the purpose of the present invention is to provide a pump for dispensing fluid products which is simple and inexpensive to manufacture and assemble.

A particular purpose of the present invention is to provide a pump for dispensing fluid products which is composed of a minimum number of constituent parts.

Another purpose of the present invention is to
5 provide a pump for dispensing fluid products, which eliminates any risk of the fluid product dispensed by said pump being corrupted, particularly by eliminating all contact with metal parts.

The subject matter of the present invention is
10 therefore a pump for dispensing fluid products comprising a pump body, a pump chamber, at least one piston sliding in said pump chamber to dispense the fluid product, a dispensing orifice, and a shutter interacting with said dispensing orifice, said shutter
15 being movable and/or deformable between a closed position of the dispensing orifice and an open position of the dispensing orifice, said shutter being elastically driven to its closed position, the pump comprising only one elastic element, such as a spring,
20 adapted for bringing said at least one piston back to its rest position after actuation and for driving said shutter to its closed position, and said pump body being embodied in one piece with said shutter.

To advantage, said spring is away from any contact
25 with the fluid product.

To advantage, the pump comprises a retaining ring adapted to anchor said pump to a tank.

According to a first embodiment of the present invention, said pump body is embodied in one piece with
30 said retaining ring.

To advantage, said retaining ring is embodied in one piece with a plunger tube intended to extend into a tank.

To advantage, said retaining ring is embodied in
5 one piece with an inlet valve seat of the pump chamber.

Preferably, the pump comprises a dispensing head including the dispensing orifice.

According to one embodiment variant of the invention, said pump body is placed inside said
10 dispensing head.

To advantage, said dispensing head is connected, particularly by being snapped, irremovably onto said retaining ring, said dispensing head and said retaining ring forming a stop to define the rest position of the
15 pump.

According to one embodiment variant of the present invention, an insert is placed in the pump chamber upstream of the dispensing orifice.

To advantage, said insert is embodied in one piece
20 with said shutter.

To advantage, said pump is constituted by only four parts including the part forming the dispensing head, the part forming the piston and shutter, the part forming the spring, and the part forming the pump body,
25 retaining ring and plunger tube.

To advantage, the part forming the pump body, retaining ring and plunger tube also forms the inlet valve seat of the pump chamber, interacting with a valve element.

According to one embodiment variant, the valve element is integral with the part forming the piston and shutter.

To advantage, said pump chamber is placed
5 immediately upstream of said dispensing orifice, said shutter forming an outlet valve of said pump chamber.

The subject matter of the present invention also comprises a device for dispensing fluid products, including a tank and a pump as described above.

10 To advantage, the pump is anchored, in particular by being snapped onto the tank with the interposition of a gasket.

Other characteristics and advantages of the present invention will emerge more clearly from the
15 following detailed description of a number of embodiments and variants of the present invention, drawn up with reference to the appended drawings, given as non-restrictive examples and wherein:

- figure 1 is a diagrammatic view in transverse
20 cross-section of a device for dispensing fluid products comprising a pump for dispensing fluid products embodied according to an advantageous embodiment of the present invention, in the rest position of the pump;

- figure 2 is an enlarged diagrammatic view of a
25 part of the device in figure 1;

- figure 3 is a view similar to that in figure 1 in the pump dispensing position; and

- figure 4 is an enlarged diagrammatic view of a part of the device in figures 1 and 3.

30 The dispensing pump according to the present invention comprises a pump body 10 in which at least

one piston 30, 72 slides. Said at least one piston 30, 72 slides in a pump chamber 20 to dispense a dose of fluid product through a dispensing orifice 45, each time the pump is actuated. Said pump chamber 20 preferably comprises an inlet valve 70. To avoid any contamination of the product between two actuations, the dispensing orifice 45 is provided with a shutter or obturator 38 which is movable and/or deformable between a closed position of this dispensing orifice 45 and an open position thereof, said shutter 38 being elastically driven to its closed position. According to the invention, the pump comprises only one elastic element 50, such as a spring, which is adapted both for bringing the piston 30, 72 back to its rest position after actuation and for driving the shutter 38 to its closed position. To advantage, this spring is placed away from any contact with the fluid product, which avoids any danger of contamination, particularly when this spring is made of metal. Preferably, the pump comprises a dispensing head 40 which incorporates the dispensing orifice 45. To advantage, the pump chamber 20 is placed at least partially in said dispensing head 40, directly upstream of said dispensing orifice 45. The shutter 38 then forms the outlet valve of this pump chamber. The pump may be anchored or fixed to a tank 60 containing the fluid product by means of a retaining or fixing ring 15 which may be of any desired type, able for example to be screwed on, snapped on or crimped. Preferably, the pump is assembled on the tank 60 by means of said retaining ring 15 with interposition of a gasket 65 between these two elements.

The figures show an advantageous embodiment of the present invention. In this embodiment, the retaining ring 15 is to advantage embodied in one piece with the pump body 10. Preferably, this retaining or dip ring 15 is also embodied in one piece with a plunger tube 18 which extends towards the bottom of the tank 60. As shown in the figures, this plunger tube 18 may also extend inside the pump body through an axial tubular extension forming the valve seat 71 of the inlet valve 70 of the pump chamber 20. The piston 30 is embodied in one piece with the shutter 38. Moreover, an insert 39 may be provided upstream of the dispensing orifice 45 in the pump chamber 20, this insert being preferably embodied in one piece with said shutter 38. This insert 39 may form at its lower end the valve element 75 of the inlet valve 70 of the pump chamber, which interacts with the valve seat 71 described previously. As shown in the figures, the pump includes only one spring 50, which in this embodiment is placed away from the pump body 10, outside said retaining ring 15, so that it is away from all contact with the fluid product. To advantage, the pump comprises a second piston 34, preferably integral with the first piston 30, and which slides in a sealed way in the dispensing head 40 in order to partly reduce said pump chamber 20.

The pump shown in the figures operates as follows. When the user presses on the dispensing head 40 from the position shown in figure 1, the dispensing head descends axially relative to the tank by compressing the spring 50. In doing this, the valve element 75 formed on the lower end of the insert 39 interacts with

the valve seat 71 of the inlet valve 70 to close this inlet valve. The volume of the pump chamber 20 is then defined and extends between the pump body 10, the first piston 30, and the second piston 34 and the shutter 38 which closes the dispensing orifice 45. Applying further axial actuation force to the dispensing head 40 causes a rise in pressure in the pump chamber 20, which causes an axial displacement of the piston 30, and therefore of the shutter 38 moving away from the dispensing orifice 45, allowing the product to be dispensed through it. When the user relaxes his pressure of the dispensing head 40, it is brought back to its rest position via the spring 50, just as the piston 30 and therefore the shutter 38 is also brought back to its rest position simultaneously. Preferably, the dispensing head 40 is connected, particularly by being irremovably snapped onto the retaining ring 15, forming with the latter a stop position which defines the rest position of the pump. The pump chamber 20 preferably extends directly upstream of the dispensing orifice 45, at least partially into the dispensing head 40. It is therefore vital for dispensing head 40 not to be movable, so as to avoid any risk of the product contained the chamber being corrupted. To advantage, the inlet valve seat 71 of the inlet valve 70 comprises air passage means 78 offset axially relative to said inlet valve seat 71, and able to interact with the valve element 75 during priming. This position is shown in figure 4, in which it can be seen that these passage means 78 are formed by one or more lateral grooves provided in the wall of the tubular element forming the

valve seat 71, and adapted to interact with the end 75 of the insert 39 provided with corresponding passage grooves or ribs. This priming position may be attained when the pump chamber is filled with air. After the air
5 is evacuated, the pump chamber then fills with product, and the next times the pump is actuated, this valve element 75 will not be able to move as far as these passage means 78 while the product is being dispensed, but only at the end of actuation. The priming means
10 therefore do not generate any risk of dose loss during normal actuation of the pump.

One particular advantage of the present invention is that it makes it possible to embody a pump with a minimum number of constituent parts. The pump shown in
15 the figures is thus able to be embodied with only four components, namely the part forming the dispensing head 40, the part forming the pump body 10, retaining ring 15 and plunger tube 18, the part forming the spring 50, and the part forming the piston 30 and the shutter 38.
20 The pump is then assembled onto the tank 60 with interposition of a gasket 65, and it can thus clearly be seen that the number of parts in the pump according to the invention is lower compared with prior art pumps, which simplifies the manufacture and assembly of
25 this pump, and thereby takes it less expensive. Likewise the operation of this pump is reliable, guaranteeing a good quality spray, and making priming easier. Likewise, the fact that the return spring is never in contact with the fluid product avoids any risk
30 of the product being corrupted through contact with a metal part (whether this spring is made of metal).

Although the invention has been described with reference to a particular embodiment thereof, it is understood that it is not restricted by the example shown. On the contrary, a man skilled in the art may
5 make any effective modifications thereto without departing from the context of the present invention as defined in the appended claims.